

CLAIMS:

- 1 1. A printed circuit board, comprising:
2 a plurality of conductive layers, wherein one of said plurality of conductive layers
3 is a first layer, wherein one of said plurality of conductive layers is a second layer;
4 two or more vias interconnecting two or more conductive layers of said plurality
5 of conductive layers, wherein a first of said two or more vias is part of a signal path
6 configured to carry a signal from said first layer to said second layer, wherein a second
7 of said two or more vias is part of a reference path configured to carry said signal from
8 a third layer to a fourth conductive layer, wherein said fourth conductive layer returning
9 said signal to a source; and
10 an electrical component embedded in said second of said two or more vias
11 between two conductive layers of said plurality of conductive layers.
- 1 2. The printed circuit board as recited in claim 1, wherein said electrical
2 component is a capacitor.
- 1 3. The printed circuit board as recited in claim 1, wherein said second of said
2 two or more vias is a via adjacent to said first via of said two or more vias.
- 1 4. The printed circuit board as recited in claim 1, wherein said electrical
2 component has a cylindrical configuration.
- 1 5. The printed circuit board as recited in claim 1, wherein a diameter from one
2 end of said electrical component changes to an other end of said electrical component,
3 wherein said second via of said two or more vias is configured so that one end of said
4 second via of said two or more vias changes in diameter to an other end of said
5 second via of said two or more vias.

1 6. The printed circuit board as recited in claim 5, wherein said electrical
2 component is embedded between the two conductive layers of said plurality of
3 conductive layers within said printed circuit board by adjusting the diameter of said
4 electrical component and the diameter of said second via of said two or more vias.

1 7. The printed circuit board as recited in claim 1, wherein said electrical
2 component has a greater diameter in a center than at ends of said electrical
3 component, wherein each end of said electrical component has a conductive cap
4 which is tinned.

1 8. The printed circuit as recited in claim 1, wherein said electrical component is
2 packaged as a pin, wherein each end of said electrical component is soldered to said
3 two conductive layers of said plurality of conductive layers within said printed circuit
4 board.

1 9. The printed circuit as recited in claim 1, wherein said second layer is
2 configured to carry said signal to a load, wherein said third layer is configured to
3 return said signal from said load.

- 1 10. A printed circuit board, comprising:
2 a plurality of conductive layers;
3 two or more vias interconnecting two or more conductive layers of said plurality
4 of conductive layers; and
5 an electrical component embedded in a particular via between two conductive
6 layers of said plurality of conductive layers.
- 1 11. The printed circuit board as recited in claim 10, wherein said electrical
2 component is a two terminal electrical component.
- 1 12. The printed circuit board as recited in claim 10, wherein said electrical
2 component is a capacitor.
- 1 13. The printed circuit board as recited in claim 10, wherein said electrical
2 component is a resistor.
- 1 14. The printed circuit board as recited in claim 10, wherein said electrical
2 component is an inductor.
- 1 15. The printed circuit board as recited in claim 10, wherein said electrical
2 component is a diode.
- 1 16. The printed circuit board as recited in claim 10, wherein said electrical
2 component has a cylindrical configuration.
- 1 17. The printed circuit board as recited in claim 10, wherein a diameter from one
2 end of said electrical component changes to an other end of said electrical component,
3 wherein said particular via is configured so that one end of said particular via changes
4 in diameter to an other end of said particular via.

1 18. The printed circuit board as recited in claim 17, wherein said electrical
2 component is embedded between two conductive layers of said plurality of
3 conductive layers by adjusting the diameter of said electrical component and the
4 diameter of said particular via.

1 19. The printed circuit board as recited in claim 10, wherein said electrical
2 component has a greater diameter in a center than at ends of said electrical
3 component, wherein each end of said electrical component has a conductive cap
4 which is tinned.

1 20. The printed circuit as recited in claim 10, wherein said electrical component is
2 packaged as a pin, wherein each end of said electrical component is soldered to said
3 two conductive layers of said plurality of conductive layers.

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- 1 21. A method for reducing impedance within a reference path in a printed circuit
2 board comprising the steps of:
- 3 forming said printed circuit board comprising a plurality of conductive layers,
4 wherein one of said plurality of conductive layers is a first layer, wherein one of said
5 plurality of conductive layers is a second layer, wherein said printed circuit board further
6 comprises two or more vias interconnecting two or more conductive layers of said
7 plurality of conductive layers, wherein a first of said two or more vias is part of a signal
8 path configured to carry said signal from said first layer to said second layer, wherein a
9 second of said two or more vias is part of a reference path configured to carry said signal
10 from a third layer to a fourth conductive layer; and
- 11 embedding an electrical component in said second of said two or more vias
12 between two conductive layers of said plurality of conductive.
- 1 22. The method as recited in claim 21, wherein said electrical component is a
2 capacitor.
- 1 23. The method as recited in claim 21, wherein said second via of said two or
2 more vias is a via adjacent to said first via of said two or more vias.
- 1 24. The method as recited in claim 21, wherein said electrical component has a
2 cylindrical configuration.
- 1 25. The method as recited in claim 21, wherein a diameter from one end of said
2 electrical component changes to an other end of said electrical component, wherein
3 said second via of said two or more vias is configured so that one end of said second
4 via of said two or more vias changes in diameter to an other end of said second via of
5 said two or more vias.

1 26. The method as recited in claim 25 further comprising the step of:
2 embedding said electrical component between two conductive layers of said
3 plurality of conductive layers within said printed circuit board by adjusting the diameter
4 of said electrical component and the diameter of said second via of said two or more vias.
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1 27. The method as recited in claim 21, wherein said electrical component has a
2 greater diameter in a center than at ends of said electrical component, wherein each
3 end of said electrical component has a conductive cap which is tinned.

1 28. The method as recited in claim 21, wherein said electrical component is
2 packaged as a pin, wherein each end of said electrical component is soldered to said
3 two conductive layers of said plurality of conductive layers within said printed circuit
4 board.

1 29. The method as recited in claim 21, wherein said second layer is configured to
2 carry said signal to a load, wherein said third layer is configured to return said signal
3 from said load.

1 30. A method for saving space in a printed circuit board comprising the steps of:
2 forming said printed circuit board comprising a plurality of conductive layers,
3 wherein said printed circuit board further comprises two or more vias interconnecting
4 two or more conductive layers of said plurality of conductive layers; and
5 embedding an electrical component in a particular via between two conductive
6 layers of said plurality of conductive layers.

1 31. The method as recited in claim 30, wherein said electrical component is a two
2 terminal electrical component.

1 32. The method as recited in claim 30, wherein said electrical component is a
2 capacitor.

1 33. The method as recited in claim 30, wherein said electrical component is a
2 resistor.

1 34. The method as recited in claim 30, wherein said electrical component is an
2 inductor.

1 35. The method as recited in claim 30, wherein said electrical component is a
2 diode.

1 36. The method as recited in claim 30, wherein said electrical component has a
2 cylindrical configuration.

1 37. The method as recited in claim 30, wherein a diameter from one end of said
2 electrical component changes to an other end of said electrical component, wherein
3 said particular via is configured so that one end of said particular via changes in
4 diameter to an other end of said particular via.

1 38. The method as recited in claim 37, wherein said electrical component is
2 embedded between two conductive layers of said plurality of conductive layers by
3 adjusting the diameter of said electrical component and the diameter of said particular
4 via.

1 39. The method as recited in claim 30, wherein said electrical component has a
2 greater diameter in a center than at ends of said electrical component, wherein each
3 end of said electrical component has a conductive cap which is tinned.

1 40. The method as recited in claim 30, wherein said electrical component is
2 packaged as a pin, wherein each end of said electrical component is soldered to said
3 two conductive layers of said plurality of conductive layers.